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Nova Persei. By Thos. W. Backhouse.

The following table gives details of my observations of Nova *Persei*:—Column 1 gives the date, column 2 the Greenwich mean time of the observation, column 3 the power of instrument used, 4 denoting opera-glasses, 9 the finder, and 20 a $4\frac{1}{4}$-inch refracting telescope. o.f. in this column denotes that the instrument was out of focus. Column 4 gives the assumed relative absorption for the night, calling it 1·0 when it is as clear as it is ever likely to be at the place of observation; column 5 gives the assumed zenithal absorption in magnitude; column 6 gives the calculated value of a step, column 7 the resulting magnitudes of the Nova, and 8 the comparison stars.

The last column is reserved for any notes to the observations, as hindrances &c. When the observation is made anywhere else than at Sunderland the place of observation is given in this column.

The method of comparison used is that of Argelander, namely, by step estimations, the Nova being compared with the stars named in column 8. First the magnitudes of the comparison stars in each sequence were computed, using as standards the Harvard photometric magnitudes taken from the Harvard Photometry, with the exception of those for t, v, w, and y^2, which are from the Harvard Durchmusterung. An allowance has been made in the case of β *Geminorum*, κ *Persei*, t, and y^2, on account of their ruddy colour, such stars appearing fainter to me than to the Harvard observers. Then an average of these resulting magnitudes for each star was taken, and these averages were adopted as standards for computing the Nova.

t and y^2 have sometimes been observed, but have not been used for obtaining the magnitude of the Nova unless inserted in column 8. Allowance has been made for atmospheric absorption in the cases where it is given in columns 4 and 5; in other cases it was not thought it would appreciably affect the result.

The stars with which the Nova has been compared are in *Perseus*, with the exception of *Capella*, α *Canis Minoris*, and α and β *Geminorum*, but I have used letters to denote the smaller stars, their identification being as follows:—

u = 36 Persei
s = B.D. +45°, 811
z = B.A.C. 1172
r = B.D. +45°, 804
t = „ +44°, 648

v = B.D. +44°, 757 }
„ 759 }
w = „ +43°, 730
y = „ +44°, 734
y^2 = „ +44°, 732

When the observation of y is thought to have included the

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neighbouring star y^2, the observed magnitude of the combination has been used.

The adopted magnitudes of the stars are given below with the Harvard photometric value.

	Adopted Mag.	Harvard Mag.		Adopted Mag.	Harvard Mag.
α Can. Min.	0·49	0·46	30 Persei	5·47	5·37
β Gem.	1·29	1·12	*s*	5·57	5·64
α „	1·66	1·56	*z*	5·74	5·71
α Persei	1·98	1·94	*r*	5·96	6·14
β „	2·19	2·31	y & y^2	6·04	5·80
ε „	3·04	3·04	*y*	6·27	6·04
ν „	4·00	4·00	*t*	6·75	6·37
κ „	4·11	3·95	*v*	6·60	6·82
32 „	4·89	4·84	*w*	6·74	6·91
u „	5·35	5·40	y^2	...	7·32

Sometimes some of the stars were observed in darker sky than others in the same comparison, but no account has been taken of this, as the differences would only be slight.

In two cases where the step value came out very high an assumed value of ·07 magnitude has been used.

In spite of the ruddy colour of the Nova during a considerable part of its apparition it did not appear to be relatively brighter in twilight or moonlight than in a dark sky, as ruddy stars usually do.

Date.	G.M.T.	Power.	Rel. Abs.	Z. Abs.	S. Value.	Mag. of Nova.	Comparison Stars.	Notes.
1901.	h m							
Feb. 22	11 5	...	...	...	...	Abt. 0·8	...	Sky covered with clouds not uniform.
24	6 23	...	...	...	..	Abt. 0·2	...	S. Shields. Owing to bright twilight, and the sky being covered with more or less cloud, only two stars are visible to the naked eye, Nova Persei and Capella (H.P. mag. 0·2). Owing to irregularities in the clouds it is impossible to tell which is the brighter.
26	10 15	...	1·5	·356	·072	1·27	α Can. Min.; β Gem., α Gem.; α.	Bright moonlight.
26	12 11	...	1·2	·320	·08	1 21	β Gem., α Gem.	„ „

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Date.	G.M.T.	Power.	Rel. Abs.	Z. Abs.	S. Value.	Mag. of Nova.	Comparison Stars.	Notes.
1901.	h m							
Feb. 27	9 35	...	1·5	·356	·065	1·46	β Gem., α Gem. α	Bright moonlight.
Mar. 1	10 20	...	1·4	·344	·085	2·10	α, β.	
2	7 10	...	...	...	·153	2·51	,,	Moonlight. Altitudes practically equal.
3	9 50	...	1·0	·296	·068	2·41	α, β, ε.	Bright moonlight.
5	7 17	...	...	...	·07	2·54	,,	Altitudes equal.
7	7 55	...	...	...	·079	2·91	β, ε.	,, ,,
8	9 0	...	...	...	·075	3·12	ε	,, ,,
9	10 55	...	...	...	·099	3·40	ε, ν.	,, ,,
12	9 5	...	...	...	·067	3·52	,,	,, ,,
13	8 35	...	...	...	·075	3·80	,,	Shields. Altitudes equal.
20	7 40	...	1·0	·296	·094	3·60	,,	Twilight.
20	10 20	...	1·0	·263	·078	3·67	,,	
21	9 15	...	1·0	·263	·082	3·86	,,	
21	11 45	...	...	...	...	4·00	ν	Nova = ν Persei. Altitudes equal.
23	7 51	...	1·0	·296	·067	3·85	ε, ν.	Stockton. Twilight.
23	8 20	...	1·0	·279	·067	3·85	,,	Norton, near Stockton. Slight moonlight.
25	10 53	4 o.f.	...	...	·068	5·44	ν, 32, 30	Altitudes equal.
26	10 20	4 o.f.	1·0	·296	·102	4·10	ν, 32.	Bright moonlight.
26	11 50	4 o.f.	1·0	·296	·079	4·00	,,	,, ,,
28	9 15	4 o.f.	1·4	·344	·055	5·00	32, 30	,, ,,
28	11 35	4 o.f.	1·4	·344	·066	4·80	ν, 32	,, ,,
28	12 0	4 o.f.	1·2	·320	·063	4·85	,,	,, ,,
28	16 18	4 o.f.	1·0	·296	·04	4·73	,,	Twilight.
30	8 40	4 o.f.	1·0	·296	...	3·99	ν	Nova = ν. Brt. moonlight.
31	8 5	4 o.f.	...	...	·064	4·40	ν, 32	Brt. moonlight, alts. equal.
31	8 42	4 o.f.	...	...	·054	4·39	,,	,, ,,
31	9 17	4 o.f.	...	...	·055	4·39	,,	,, ,,
31	9 58	4 o.f.	...	...	·056	4·35	,,	,, ,,
31	10 27	4 o.f.	...	...	·056	4·35	,,	,, ,,
31	11 41	4 o.f.	...	...	·06	4·34	,,	Bright moonlight, altitudes practically equal.
Apr. 1	7 56	4 o.f.	1·1	·308	·064	4·19	,,	Bright twilight and moonlight.

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Date.	G.M.T.	Power.	Rel. Abs.	Z. Abs.	S. Value.	Mag. of Nova.	Comparison Stars.	Notes.
1901.	h m							
Apr. 1	9 32	4 o.f.	1·1	·308	·073	4·33	ν, 32	Bright moonlight.
1	10 24	4 o.f.	1·1	·308	·066	4·30	,,	,, ,,
1	12 35	4 o.f.	1·1	·308	·06	4·31	,,	,, ,,
4	7 59	4 o.f.	...	...	·079	4·17	,,	Bright twilight, altitudes practically equal.
4	8 21	4 o.f.	...	...	·079	4·17	,,	Brightish twilight, altitudes practically equal.
4	8 45	4 o.f.	...	...	·087	4·10	,,	Brightish moonlight or twilight, alts. equal.
4	9 52	4 o.f.	...	...	·073	4·16	,,	Bright moonlight, altitudes equal.
4	10 29	4 o.f.	...	...	·076	4·12	,,	,, ,,
4	11 21	4 o.f.	1·0	·296	·07	4·12	,,	Bright moonlight.
5	9 0	4 o.f.	1·0	·279	·073	4·40	,,	Slight twilight or moonlight.
5	9 45	4 o.f.	1·0	·296	·066	4·40	,,	Moonlight.
8	8 35	4 o.f.	1·0	·296	·075	4·53	,,	South Shields. Twilight.
8	9 35	4 o.f.	1·0	·263	·07	4·46	,,	
8	10 4	4 o.f.	1·0	·263	·063	4·41	,,	
8	15 42	4 o.f.	1·1	·308	·037	4·35	,,	Bright twilight and moonlight.
9	15 18	9	1·1	·308	·039	4·62	,,	Bright moonlight.
9	15 27	4 o.f.	1·1	·308	·041	4·63	,,	,, ,,
11	9 18	4 o.f.	...	...	·041	5·56	30, *z*.	Alts. practically equal.
11	9 39	4 o.f.	...	...	·044	5·55	,,	,, ,, ,,
12	9 12	4 o.f.	...	...	·083	4·67	ν, 32.	Altitudes equal.
13	8 54	4 o.f.	...	...	·058	4·42	,,	West Hartlepool. Slight twilight, alts. equal.
13	9 25	4 o.f.	...	...	·056	4·40	,,	W. Hartlepl. Alts. equal.
14	8 27	4 o.f.	...	...	·073	5·66	30, *z*.	West Hartlepool. Twilight, altitudes equal.
14	8 31	4	...	...	·11	5·60	,,	,, ,, ,,
14	8 49	4 o.f.	...	...	·055	5·55	,,	West Hartlepool. Slight twilight, alts. equal.
14	9 54	4 o.f.	...	...	·047	5·58	30; *z*	W. Hartlep'l. Alts. equal.
	10 5	4 o.f.	...	...	·044	5·57	,,	,, ,, ,, ,,
	10 39	4 o.f.	1·1	·280	·023	5·56	,,	,, ,, Town smoke.

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Date.	G.M.T.	Power.	Rel. Abs.	Z. Abs.	S. Value.	Mag. of Nova.	Comparison Stars.	Notes.
1901.	h m							
Apr. 14	15 15	4	1·0	·263	·063	5·74	30 ; *z* ; *y*	W. Hartlep'l. Twilight.
	15 33	4	1·0	·263	·195	5·69	30, *z*	,, ,, Step value assumed ·07 mag. Brightish twilight.
15	8 44	4 o.f.	...	...	·045	5·59	,,	Twilight. Alts. equal.
	9 15	4 o.f.	...	...	·066	5·67	,,	Slight twilight. Alts. equal
16	10 35	9 o.f.	...	...	·05	5·37	30	Town light. Alts. equal
18	15 28	4	...	...	·100	4·65	κ ; 32	Hurworth. Alts. equal.
20	9 5	4	1·3	·313	·06	5·74	30 ; *z*	Twilight.
	9 34	4 o.f.	1·7	·379	·032	5·65	30 ; *z* ; *y* & y^2	
21	9 29	4	2·0	·423	·13	5·67	30, *z*	Slight twilight and moonlight. Step value assumed ·07 mag.
24	9 47	4 o.f.	...	...	·066	5·57	,,	Moonlight. Alts. equal.
25	10 33	4	1·0	·263	·053	5·79	30 ; *z* ; *y*	,,
26	9 22	4	1·0	·263	·048	5·72	30 ; *z*	,,
May 4	10 5	20	...	...	·104	5·79	30 ; *y*	Bright twilight. Alts. equal.
15	10 9	4	1·2	·324	·049	5·85	,,	Torquay. Twilight.
16	10 15	4	1·3	·330	·037	5·83	,,	,, Brightish twilight.
20	13 40	4	1·0	·263	·045	5·57	32 ; 30	London. Brightish twilight.
24	13 25	4	1·0	·263	·073	5·78	32 ; 30 ; *y*	London. Brightish twilight.
June 1	12 20	20 o.f.	1·0	·296	·063	5·77	30 ; *y*	Bright twilight.
5	12 10	20 o.f.	1·0	·296	·066	5·92	,,	,, ,,
		20	1·0	·263	·061	6·05	32 ; *u* ; 30 ; *y* ; *v* ; *w*	,, ,,
8	11 10	20	1·5	·346	·076	4·69	ν ; κ ; 32 ; 30	,, ,,
9	12 15	20	1·0	·263	·057	5·95	32 ; *u* ; 30 ; *y* ; *v*	,, ,,
10	11 3	20	1·0	·263	·054	5·96	30 ; *y*	,, ,,
	12 15	20 o.f.	1·0	·296	·058	5·96	,,	,, ,,
	12 25	20	1·0	·263	·046	5·87	,,	,, ,,
11	11 12	20	1·0	·263	·056	5·03	32 ; 30	,, ,,
12	11 20	20	1·0	·263	·073	5·85	30 ; *y*	,, ,,
	11 35	20	1·0	·263	·063	5·90	,,	,, ,,

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Date.	G.M.T.		Power.	Rel. Abs.	Z. Abs.	S. Value.	Mag. of Nova.	Comparison Stars.	Notes.
1901.	h	m							
June 12	12	10	20	1·0	·263	·066	5·93	30 ; *y*	Bright twilight.
			20 o.f.	1·0	·296	·069	5·87	,,	,, ,,
18	12	15	20	·5	·356	·059	6·04	30; *z*; *y*	,, ,,
July 2	11	23	20	1·3	·313	·065	5·90	30; *y*	,, ,,
13	10	45	20	1·2	·296	·053	6·09	*s*; *z*; *r*; *y*	,, ,,
15	12	15	4	1·0	·263	·058	5·70	30; *z*; *y*	Brightish twilight.
26	13	20	4 o.f.	...	...	·063	5·84	30; *y* & y^2	Alts. equal. Slight twilight.
Aug. 4	11	20	4	...	...	063	6·03	*z*	Alts. equal. Bright moonlight.
19	13	0	4 o.f.	...	...	·066	5·94	*u*; 30; *s*; *z*; *r*; *y* & y^2	Alts. equal.
21	11	50	4 o.f.	...	...	·063	5·89	*z*; *y* & y^2	,, ,,
22	10	40	4 o.f.	...	...	·063	5·94	,,	,, ,, Sky light with electric light.
24	10	40	20 o.f.	...	...	·063	6·18	*z*; *y*	Alts. equal. Bright moonlight.
26	11	50	4 o.f.	...	...	...	6·04	*y* & y^2	Moonlight. Alts. equal.
	14	0	20 o.f.	...	...	·056	6·20	*u*; 30; *s*; *z*; *r*; *y*; *v*	Alts. equal.
	14	45	4 o.f.	...	...	·052	6·14	*u*; 30; *s*; *z*; *r*; *y* & y^2; *v*	,, ,,
27	10	40	4	...	...	·063	6·14	*z*; *y*	,, ,, Bright moonlt.
28	10	40	20 o.f.	...	...	·051	6·26	*s*; *z*; *r*; *y*; *v*	,, ,, ,, ,,
31	9	50	20 o.f.	...	...	·042	6·27	*z*; *r*; *y*; *v*	,, ,, ,, ,,
Sept. 1	12	15	20 o.f.	...	...	·044	6·25	*s*; *z*: *r*; *y*; *v*	,, ,, ,, ,,
4	10	15	4 o.f.	...	...	·042	6·06	*s*; *z*; *r*; *y* & y^2	,, ,, Slight moonlt.
	10	30	20 o.f.	...	...	·069	6·29	*r*; *y*; *v*	,, ,, Moonlight.
	11	10	4	...	...	·06	6·15	,,	,, ,, ,,
5	10	50	4 o.f.	...	...	·063	6·08	*z*; *r*; *y* & y^2; *v*	,, ,, Slight moonlt.
	11	50	20 o.f.	...	...	·055	6·25	*z*; *r*; *y*; *v*	,, ,, ,, ,,
			4 o.f.	...	...	·061	6·21	*y*	Broughty Ferry. Alts. equal.
26	10	40	20 o.f.	...	...	·044	6·42	*z*; *r*; *y*; *v*	Alts. equal. Moonlight.
Oct. 4	10	15	4 o.f.	...	...	·074	6·47	*r*; *y* & y^2; *v*	,,
	10	20	20 o.f.	...	...	·063	6·55	*r*; *y*; *v*	,,
5	10	3	4 o.f.	...	...	·084	6·36	*y* & y^2; *v*	,,

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1901.	h	m							
Oct. 6	10	3	4 o.f.	...	...	·063	6·40	y & y^2; v	Alts. equal.
7	10	25	4 o.f.	...	...	·068	6·40	"	"
8	11	55	4 o·f.	...	...	·063	6·40	"	"
9	9	42	20 o.f.	...	...	·067	6·57	y; v	"
10	10	25	4 o.f.	...	...	·078	6·42	y & y^2; v	"
	10	40	20 o.f.	...	...	·078	6·51	y; v	"
11	10	30	4 o.f.	...	...	·055	6·41	y & y^2; v	"
17	9	50	4 o.f.	...	...	·063	6·43	"	"
25	10	50	20 o.f.	...	...	·103	6·74	y; v	" Moonlight.
Nov. 12	7	55	4 o.f.	...	...	·063	6·66	t; v	"
15	8	15	4 o.f.	...	...	·063	6·69	"	"

West Hendon House, Sunderland.

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Ephemeris for Physical Observations of

Greenwich Noon. 1902.		P.	L–O.	B.	Λ–L.	*B.*	Q.	E.
Oct.	5	3°·03	231°·89	+20°·90	° ...	+10°·66	289°·26	29°·24
	7	3·82	233·14	21·19	...	11·02	289·56	29·51
	9	4·60	234·39	21·47	29·22	11·38	289·85	29·79
	11	5·37	235·64	21·74	...	11·73	290·12	30·06
	13	6·14	236·89	22·00	...	12·08	290·38	30·33
	15	6·90	238·14	22·25	...	12·43	290·63	30·59
	17	7·66	239·39	22·49	30·75	12·77	290·87	30·85
	19	8·41	240·63	22·71	...	13·11	291·10	31·11
	21	9·16	241·88	22·92	...	13·44	291·32	31·36
	23	9·90	243·12	23·12	...	13·77	291·53	31·61
	25	10·64	244·36	23·31	32·24	14·10	291·73	31·86
	27	11·37	245·60	23·48	...	14·42	291·92	32·11
	29	12·09	246·83	23·64	...	14·74	292·10	32·34
	31	12·80	248·06	23·79	...	15·06	292·28	32·58
Nov.	2	13·51	249·29	23·94	33·67	15·37	292·44	32·81
	4	14·21	250·52	24·08	...	15·68	292·59	33·04
	6	14·90	251·74	24·20	...	15·99	292·73	33·26
	8	15·58	252·95	24·31	...	16·29	292·86	33·48
	10	16·25	254·16	24·41	34·99	16·59	292·98	33·68
	12	16·92	255·37	24·49	...	16·88	293·09	33·89
	14	17·58	256·57	24·56	...	17·17	293·19	34·09
	16	18·22	257·75	24·62	...	17·46	293·28	34·28
	18	18·86	258·93	24·67	36·26	17·74	293·36	34·47
	20	19·49	260·11	24·71	...	18·02	293·43	34·65
	22	20·11	261·28	24·75	...	18·29	293·50	34·82
	24	20·71	262·44	24·78	...	18·55	293·56	34·98
	26	21·30	263·58	24·80	37·35	18·81	293·61	35·13
	28	21·88	264·72	24·81	...	19·07	293·65	35·28
	30	22·44	265·84	24·80	...	19·32	293·68	35·41
Dec.	2	22·99	266·95	24·78	...	19·57	293·70	35·54
	4	23·53	268·05	24·75	38·23	19·81	293·71	35·66
	6	24·07	269·15	24·71	...	20·05	293·72	35·77
	8	24·59	270·23	24·66	...	20·29	293·72	35·87
	10	25·10	271·30	24·61	...	20·52	293·71	35·96
	12	25·59	272·35	+24·55	38·91	+20·75	293·69	36·04